

AMENDED CLAIMS

[received by the International Bureau on 25 September 2000 (25.09.00);
original claims 1, 11, 15 and 20 amended;
original claims 3, 12, 16 and 22 cancelled;
remaining claims unchanged (4 pages)]

1. A method for preparation of an anode for a solid oxide fuel cell comprising the steps of:

mixing a porous matrix material with a yttria-stabilized-zirconia (YSZ) powder, forming a porous matrix material/powder mixture;

forming said porous matrix material/powder mixture into a porous YSZ layer;

calcining said porous YSZ layer; and

impregnating said porous YSZ layer with a Cu-containing salt solution.

2. A method in accordance with Claim 1, wherein said porous matrix material comprises a plurality of zircon fibers.

4. A method in accordance with Claim 1, wherein said porous matrix material/powder mixture is mixed with glycerol and applied to an anode side of a YSZ electrolyte, forming said porous YSZ layer on said anode side of YSZ electrolyte.

5. A method in accordance with Claim 1, wherein said porous matrix material/powder mixture is added to a tapecast and said tapecast is deposited onto an anode side of a YSZ electrolyte layer, forming said porous YSZ layer on said anode side of YSZ electrolyte.

6. A method in accordance with Claim 5, wherein a cathode is applied to a cathode side of said YSZ electrolyte layer after said calcining of said porous YSZ layer.

7. A method in accordance with Claim 1, wherein a metal content of said porous YSZ layer is at least about 35% by weight of said porous YSZ layer.

8. A method in accordance with Claim 1, wherein said impregnated porous YSZ layer is calcined.

9. A method in accordance with Claim 1, wherein said porous YSZ layer is impregnated with ceria.

10. A method in accordance with Claim 9, wherein said ceria constitutes in a range of about 5% to about 40% by weight of said porous YSZ layer.

11. A method for producing a solid oxide fuel cell comprising the steps of:

mixing a porous matrix material with a yttria-stabilized-zirconia (YSZ) powder, forming a porous matrix material/powder mixture;

mixing said porous matrix material/powder mixture with glycerol, forming a slurry;

applying said slurry to an anode-facing face of a dense YSZ electrolyte layer, forming a porous anode layer/electrolyte layer assembly;

calcining said porous anode layer/electrolyte layer assembly;

applying a cathode layer to a cathode-facing face of said electrolyte layer, forming a fuel cell assembly;

impregnating said porous anode layer with a Cu-containing salt solution; and calcining said impregnated porous anode layer.

13. A method in accordance with Claim 12, wherein a metal content of said calcined impregnated porous anode layer is at least about 35% by weight of said calcined impregnated porous anode layer.

14. A method in accordance with Claim 11, wherein said porous matrix material comprises a plurality of zircon fibers.

15. In a solid oxide fuel cell comprising an anode electrode, a cathode electrode and an electrolyte disposed between said anode electrode and said cathode electrode, the improvement comprising:

said anode electrode comprising a porous YSZ layer and one of a Cu metal and a Cu alloy.

17. A solid oxide fuel cell in accordance with Claim 15, wherein said anode electrode further comprises ceria.

18. A solid oxide fuel cell in accordance with Claim 15, wherein a metal content of said anode electrode is at least about 35% by weight of said porous YSZ layer.

19. A solid oxide fuel cell in accordance with Claim 17, wherein a ceria content of said anode electrode is in a range of about 5% to 40% by weight of said porous YSZ layer.

20. A method for generating electricity comprising the steps of:
introducing at least one of a hydrocarbon and a carbonaceous fuel directly into an anode side of a solid oxide fuel cell comprising an anode electrode comprising a porous YSZ layer and one of a Cu metal and a Cu alloy, a cathode electrode and an electrolyte disposed between said anode electrode and said cathode electrode;
introducing an oxidant into a cathode side of said solid oxide fuel cell; and
directly oxidizing said at least one of said hydrocarbon and said carbonaceous fuel in said solid oxide fuel cell, resulting in generation of electricity.

21. A method in accordance with Claim 20, wherein said hydrocarbon comprises at least two carbon atoms.

23. A method in accordance with Claim 20, wherein said anode electrode further comprises ceria.

24. A method in accordance with Claim 20, wherein said carbonaceous fuel is an alcohol.

STATEMENT UNDER ARTICLE 19(1)

Claims 2, 4-10, 13, 14, 17-19, 21, 23 and 24 remain the same as originally filed. Applicants are submitting replacement pages 10-13. Original Claim 1 has been deleted and replaced with new Claim 1; original Claim 11 has been deleted and replaced with new Claim 11; original Claim 15 has been deleted and replaced with new Claim 15; and original Claim 20 has been deleted and replaced with new Claim 20. Original Claims 3, 12, 16 and 22 have been deleted.

Claims 1 and 9 have been amended to provide that the porous anode layer is impregnated with a Cu-containing salt solution. Claims 15 and 20 have been amended to provide that the anode electrode comprises a Cu metal or Cu alloy.

Applicants respectfully urge that this amendment of the claims is fully supported by the application as originally filed and, thus, incorporates no new subject matter into the application.